THE EFFECTS OF SOCIAL BACKGROUND, SEX, AND ABILITY ON THE TRANSITION TO TERTIARY EDUCATION IN THE NETHERLANDS

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Abstract

In the Netherlands, most pupils who finish the higher levels of secondary education (HAVO and VWO) continue their educational careers in tertiary education. In this article, we focused on the effects of social background and sex on vertical (level of education) and horizontal differentiation (field of education within a level) in tertiary education. First, we examined the social and sex differentiation, and, second, we estimated models to determine to what extent social and sex differentiation in the choice of higher education is dependent on differences in ability. Our analysis showed that vertical differences are more strongly related to social background than are horizontal differences. Horizontal differences depend less on social background and more on sex. Examination results affect both vertical and horizontal differences; subjects chosen affect horizontal differences only.

Introduction

Nowadays, almost all Dutch pupils who finish the higher levels of general secondary education continue their educational careers. About 94 per cent of the

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pupils who complete higher general education (HAVO) and 98 per cent of those who complete pre-academic education (VWO) proceed to one or other form of subsequent education, most often to a vocational college (HBO) or to university (WO) (ROA, 2002). There are good reasons why such a large proportion of the pupils who complete secondary education continue their educational careers. The most important reason is probably that HAVO and VWO are not seen as proper final levels of education, because pupils who complete these levels have not learnt specific occupation-related skills. As a result of the rapid expansion of education, the proportion of school-leavers without vocational qualifications has become low (de Graaf & Ultee, 1998), and even for those who have obtained diplomas in the higher levels of secondary education, the occupational returns in the labour market have decreased considerably (Wolbers, de Graaf & Ultee, 2001). The growth of formal regulations has contributed to this as well: many occupations are legally reserved for those who have completed the relevant professional training.

There may be little variation in pupils' decisions to continue their educational careers after completing HAVO or VWO, but there is much variation in the level and field of education chosen. Pupils who have completed pre-academic education (VWO) choose between two levels; the majority opt for university (WO), and the others for vocational college (HBO). Pupils who have completed higher secondary education (HAVO) have three options with regard to the level of subsequent education. A significant proportion goes to middle-level vocational education (MBO), but most continue in HBO. A small proportion of probably ambitious HAVO pupils continue their educational careers in VWO, since only the VWO diploma entitles pupils to enter university. Within HBO and WO, students have a wide range of studies to choose between. These study choices can be classified in the following fields of education: agriculture, education, behaviour/society, economics, health, art/language/culture, law/public order, natural sciences, and engineering, although not all these fields are offered at both levels. The differences in level constitute the vertical choice in tertiary education, whereas the differences in field of education refer to the horizontal choice.

In this study, we examined the transition from secondary to tertiary education in the Netherlands of a recent cohort of 3,066 pupils who completed secondary education in the 1996/1997 school year. First, we investigated to what extent the vertical and horizontal study choices made by HAVO and VWO pupils were affected by social background and by sex. This descriptive research question was followed by an explanatory one: How do differences in the choices made by pupils from higher and lower social strata, and of male and female students, come about? Our explanation followed two lines. First, we assumed that there is a relationship between social background and sex, on the one hand, and the final examination results in secondary education, on the other hand.

These final examination results are quite comparable, since the central exams are the same for all schools in the Netherlands. We expected that if the examination results were dependent on social background and sex, and if they affected the vertical and horizontal study choices made by HAVO and VWO pupils, we may find an interpretation for the social background and sex effects. The degree to which this interpretation was successful was established by comparing the social background and sex effects found using a model that controlled for final marks and a model that did not do so.

Second, it is possible that social background and sex affect the set of subjects taken by pupils in HAVO and VWO. Pupils can choose four different sets of subjects in upper secondary general education: nature/science, nature/health, economics/society, and culture/society. These sets of subjects – or *studieprofielen* as they are officially called in the Dutch language – were created in order to offer pupils specific courses aimed at certain subsequent studies, and to give them the opportunity to specialize (Van der Velden and Wolbers, 1999). We expected that the set of subjects chosen would be dependent on social background and sex, and that it would have an impact on the pupils' subsequent educational careers, in particular on the field of subsequent study and the level of that study. We investigated to what extent social background and sex were related to the set of subjects chosen by pupils in upper secondary general education, and to what extent the social background and sex effects would be explained if we took subjects into account.

There are two main reasons for raising these research questions. First, previous research suggests that the influence of the social background of the family on choices in higher education is not large in the Netherlands. In their analysis, de Graaf and Ganzeboom (1990, 1993) showed that social background has only limited effects on students' success in tertiary education provided that they have completed secondary education. In their analysis, however, higher education was not differentiated: HBO and WO were viewed together as higher education. This may have been a good approach during periods in which not so many pupils continued studying after secondary education, but now, when most pupils take this step into further education, this is much less the case. The level and the field of education taken in higher education now constitute the main aspects of choice, and hence our research focused on those elements. We answered the descriptive question as to the extent of the current impact of social background and sex on vertical and horizontal choices in higher education. Previous research in the Netherlands focused on the vertical choice in higher education, but did not consider this in combination with the horizontal choice (Bosma & Cremers, 1996; Wolbers & de Graaf, 1996; Webbink, 1997; Need & de Jong, 2000; Korteweg, van Leeuwen, de Jong & van der Veen, 2003). Other research, on the other hand, focused on the horizontal choice in education, but also did not combine the horizontal and vertical dimensions (van de Werfhorst, de Graaf & Kraaykamp, 2001).

Second, it is important to know to what extent the effects of social background and sex are direct or indirect. We speak of direct effects of social background when pupils with the same set of subjects and with the same final examination results make different choices concerning their subsequent education that are dependent on social background and sex. There are indirect effects when the effects of social background and sex on a study choice can be explained by differences in the set of subjects or by differences in the final examination results. This distinction is of great importance for the interpretation of the social background and sex effects. In the case of indirect effects of social background and sex, the source of social inequality must be looked for in secondary education.[1] In the case of direct effects, it has to do with the choices made after completing secondary education.

Theoretical background

Social background and sex can affect educational choices in different ways. For the educational transition we investigated – the transition from secondary to tertiary education – we distinguish two mechanisms. The first mechanism is that, at the end of secondary education, when pupils are 17 or 18 years old, there is a variation in ability and interests between pupils that is associated with family background. The variation in ability might show up in the better examination results of pupils from advantaged social strata, and the variation in interests might show up in the set of subjects chosen in secondary education. When pupils from higher status groups do better in secondary education, and when they choose a specific set of subjects, their subsequent choice of tertiary education will be higher (vertical choice) and directed to different fields of education (horizontal choice). The same reasoning can be applied to differences in the educational choices of men and women (Dekkers, 1990; Jonsson, 1999). When males and females differ in examination results and in subjects chosen in secondary education, it can be expected that there will be differences in their choices of a level and field of tertiary education. Dekkers (1990) showed that girls in the Netherlands do not enrol in science at university because of their lower levels of academic achievement in secondary education.

The second mechanism that explains individual differences in educational choice after secondary education has to do with direct effects of social background and sex that are independent of the effects of examination results and the set of subjects chosen in secondary education. Several types of parental resources that directly affect educational decisions have been identified in the literature. First, parents' financial resources may play a role. Higher education studies take longer and are, therefore, more costly, not only because of the direct costs involved (cost of living, tuition fees, books), but also because there are opportunity costs (loss of income) during the period in which one studies.

Second, the 'cultural capital' hypothesis argues that pupils for whom the difference between the culture at home and the culture at school is too great perform less well than those who were raised with a liking for learning, reading, and formal cultural expression (Bourdieu, 1973; DiMaggio, 1982; de Graaf, de Graaf & Kraaykamp, 2000; de Graaf and de Graaf, 2002). Third, educational aspirations affect educational decisions (Boudon, 1974; Gambetta, 1987; Breen and Goldthorpe, 1997). This rational choice hypothesis argues that it is likely that children from advantaged social backgrounds have higher educational aspirations than do other children since they need higher education to avoid downward intergenerational mobility. Children whose origins are in lower classes do not run the risk of downward mobility when they choose to enter the lower levels of tertiary education.

We expected that sex would also have direct effects, as it is likely that men and women have different preferences for types of tertiary education. Earlier research has shown that as many women as men participate in tertiary education in the Netherlands, although there is some evidence that there still is a sex difference with respect to university enrolment (Müller & Wolbers, 2003). These differences may have to do with inequalities in the life-course perspectives of men and women, and with persistent differences in their perceived roles later in life when work in the home and on the labour market have to be combined in one family (Polachek, 1981). Women may, therefore, focus on occupations in which it is possible to work part-time, and that can more easily be interrupted, so that they can fulfil their primary responsibility for the family. Such occupational ambitions are perhaps found more in the fields of education offered in vocational colleges (with professions such as nursing or teaching) and less in the fields offered at university. In general, we expected that both in vocational colleges and in universities there would be large differences between men and women with respect to field of study.

In our approach we aimed to find out whether the effects of social background and sex work through the indirect mechanism or through the direct mechanism. We had excellent measures for the final examination results in the Dutch language and mathematics, and the subjects chosen in secondary education. We recognized, however, that if the initial differences in the study choices of pupils from higher and lower social backgrounds, and of men and women, did not decrease when we compared individuals with equal examination results and the same set of subjects, then the hypothesis on the cognitive skills would have to be rejected. Unfortunately, we could not assess which type of parental resources was supported in that case, since information on the financial and cultural resources of the parents was not available in the data that were used in the empirical part of this study, nor did we have information on the educational aspirations of the pupils and their parents.

What do all these considerations mean for the vertical study choices of pupils from HAVO and VWO? As said above, the decision whether or not to enter subsequent education after HAVO or VWO is no longer an issue, and we therefore focused in the hypotheses concerning HAVO pupils on the choice between middle vocational education (MBO), vocational college (HBO), and pre-academic education (VWO), and concerning VWO pupils, on the choice between vocational college (HBO) and university (WO). For HAVO pupils, we assumed that the choice of MBO was never planned. In principle, lower/middle secondary education (LBO/MAVO) prepares pupils for intermediate vocational education, whereas HAVO prepares pupils for vocational college. A HBO degree provides access to occupations of a higher level than does an MBO qualification, and wages are also much higher. Furthermore, a HBO degree gives a person the right to enter university. Considering the greater value of HBO, we expected that HAVO pupils would only choose MBO if their resources were so low that their perception of the costs of entering HBO were high. This may initially be caused by a lack of cognitive skills. Some may have experienced difficulties in obtaining the HAVO diploma and, therefore, decided not to be ambitious in their subsequent studies. It is also possible that their parental resources were limited. Cultural, financial, and social arguments may make pupils opt for a less expensive or shorter course of studies, which preserves the link with their social background. We expected the choice of VWO after successful completion of HAVO to be taken in particular by pupils from higher social strata who had also obtained good results in the HAVO examinations.

The same type of arguments can be formulated for the vertical study choices of VWO pupils. For them, studying at university is clearly superior to studying in a vocational college, even though HBO is not so clearly regarded as inferior by VWO pupils as HBO is for HAVO pupils. But, again, we expected the choice for HBO to be made in particular by those who either did not achieve good results in VWO or who lacked favourable parental resources.

Finally, we considered hypotheses with regard to the horizontal study choices. Again, we used the hypotheses on pupils' cognitive and parental resources. First, we expected higher marks for mathematics to lead to the choice of a technical course of studies (natural sciences, engineering), and higher marks for the Dutch language to lead to humanities or social studies (art/language/culture, behaviour/society). Second, we expected social background to have only modest effects on horizontal differentiation. The cultural capital of pupils with higher educated parents may lead to a greater chance of those pupils choosing a course of studies within the field of education or art/language/culture. Parental financial resources may have a positive effect in particular on the choice of more expensive or longer courses of studies, such as medicine. We assumed that social background has a direct effect on the choice of studies related to a higher social status or a higher income. Social arguments also play a role. We

expected that pupils from lower social classes would consider themselves more likely to fail in the more academic studies and that their social environment would encourage them to learn a trade. This would then be expressed in particular in the choice of a technical course of studies. However, the different arguments regarding the effects of the different types of parental resources may cancel each other out, as financial, cultural, and social resources are strongly correlated. Third, we expected to find that more women than men would choose studies in health, behaviour/society, education, and art/language/culture.

Whereas the set of subjects taken in secondary education has obvious relationships with the field of education in higher education, it is less clear to what extent examination results affect horizontal differentiation. Here, we followed the concept of 'comparative advantage' (Jonsson, 1999), which argues that it is important to distinguish between different types of subjects. Pupils who do better in a specific subject, will probably continue their careers in the field in which this subject is prominent. In this study, we focused on differences between pupils who did well in the Dutch language and pupils who did well in mathematics.

Research design

The data used in this study came from a large-scale, nationally representative school-leavers' survey that was conducted in the Netherlands in 1998 by the Research Centre for Education and the Labour Market: RUBS (*Registratie van Uitstroom en Bestemming van Schoolverlaters*) (ROA, 1998). This postal survey, which has been held annually since the early 1990s, covers school-leavers with a diploma from low/middle secondary education (LBO/MAVO), higher secondary education (HAVO/VWO), and middle-level vocational education (MBO). Pupils are interviewed almost one and a half years after having left their schools, which means that the figures presented here are based on the responses of school-leavers from the 1996/1997 cohort. The information collected concerns in particular the destination of school-leavers, including both their continuation in subsequent education and their entry into the labour market. In addition, a number of questions are asked in order to evaluate the curriculum of the course of studies. This concerns the importance of and the attention given to all kinds of competences, knowledge, and skills received during the education.[2]

For the purpose of the current analysis, we selected only those respondents who successfully completed HAVO or VWO. Given a response rate of 58 per cent for HAVO and 66 per cent for VWO, this selection resulted in an analytic sample size of 3,066 pupils (1,637 and 1,429 respondents, respectively) after list-wise deletion of respondents for whom information was missing on any of the variables used.

Vertical differences refer to the choice of a particular level of education (including no subsequent study), and horizontal differences are concerned with the choice of a field of education. Although the two choices may be related – for example, because there is a difference between the fields of education offered at vocational college (HBO) and university (WO) – they were analysed separately. We assumed that in most cases the choice was made first for a particular educational level and only then for a particular field of education. For pupils who had completed HAVO, the choices were HBO, middle-level vocational education (MBO), pre-academic education (VWO), and no subsequent education. For those who had finished VWO, the alternatives were WO, HBO, and no subsequent education.[3] Within HBO and WO, students have a wide range of studies to choose between. In the analysis, however, these study choices were clustered into eight fields of education. Within HBO, the following fields of education were distinguished: agriculture, education, behaviour/society, economics, health, art/language/culture, law/public order, and engineering. Within WO, the main fields of education are: agriculture, behaviour/society, economics, health, art/language/culture, law/public order, natural sciences, and engineering.

The social background of pupils was operationalized as the maximum educational level attained by both parents, ranging from primary education (LO) to university level, on a scale ranging from 1 to 8. In those cases in which information on one of the parents was missing, only the information on the other parent was used. In the descriptive analysis, we represented the parents' level of education on the basis of four categories: LO/LBO/MAVO, MBO/HAVO/VWO, HBO, and WO.

Gender differences were determined by differentiating between males and females in the analysis.

The examinations results were measured using the final marks for the Dutch language and for mathematics. The marks ranged from 4-10. In the descriptive analysis, these variables were represented in categories. In the multivariate analysis, we included the sum of the examination results for the Dutch language and mathematics in the model, indicating the average effect of the final exam marks on educational choices. In addition, we used a measure of comparative advantage. For that purpose, the examination result for mathematics was subtracted from the examination result for the Dutch language, creating a new variable where a positive value referred to a relatively high examination result for the Dutch language compared to mathematics. This variable allowed us to assess the extent to which the gap between examination results for the Dutch language and mathematics affected educational choices.

The set of subjects taken was divided into four types, following as closely as possible the recently introduced *studieprofielen* (van der Velden & Wolbers, 1999): nature/science, nature/health, economics/society and culture/society.

Respondents whose set of subjects failed to meet the criteria of one of these four types, were referred to the category 'other'.

Lastly, we included age in the multivariate analysis to control for any delay in the educational careers of pupils caused by repeating classes or taking indirect educational pathways. The age variable was measured in years: 17 years corresponded to zero for HAVO; 18 years represented zero for VWO.

Results

Below, we describe the differentiation by social background and sex following secondary education. Table 1 shows that there is considerable variation in the choice of subsequent education between pupils from various social strata. In HAVO, fewer pupils with higher educated parents than those with lower educated parents chose a course of studies in middle-level vocational training (MBO). For example, 23 per cent of HAVO pupils with low-educated parents (LO/LBO/MAVO) chose MBO, whereas the corresponding percentage of HAVO pupils with university-educated parents was only 8 per cent. In contrast, more HAVO pupils with highly educated parents started a course of studies in vocational college (HBO) or pre-academic secondary education (VWO). It is striking that in particular many HAVO pupils whose parents completed a course of studies in HBO also, chose to attend vocational college (HBO). Many HAVO pupils with university-educated parents chose VWO as an indirect route to university. Both in the choice of HBO and in that of VWO, there seems to be an intergenerational transfer of educational level.

Following pre-academic secondary education (VWO), considerably more pupils with highly educated parents preferred university (WO) to vocational college (HBO) than those with lower educated parents. In the case of pupils with parents who completed their education at university level, 79 per cent chose WO, against 20 per cent who chose HBO, whereas for those whose parents completed their education at the lowest educational level (LO/LBO/MAVO), the percentages were 57 and 41 per cent, respectively.

With respect to sex differences in the choice of level of education, we found significant results only among pupils who completed VWO. In VWO, more male than female pupils chose to study at university.

Table 1: *Choice of subsequent education made by HAVO and VWO pupils by parents' level of education and sex: Percentages*

	Choice of subsequent education				
	None	MBO	VWO	HBO	WO
HAVO					
Parents' level of education					
LO/LBO/MAVO (32.0)	5.9	23.0	2.1	68.9	-
MBO/HAVO/VWO (29.4)	8.0	18.6	5.8	67.6	-
HBO (26.4)	2.6	15.8	6.1	75.5	-
WO (12.2)	7.5	7.9	12.7	71.8	-
Chi-square statistic (df=3)	14.2**	26.0**	33.4**	8.6*	-
Sex					
Male (44.2)	5.7	18.1	6.2	70.0	-
Female (55.8)	6.0	17.9	5.0	71.0	-
Chi-square statistic (df=1)	0.1	0.1	1.2	0.2	-
All (100.0)	5.9	18.0	5.5	70.6	-
VWO					
Parents' level of education					
LO/LBO/MAVO (21.0)	2.9	-	-	40.6	56.5
MBO/HAVO/VWO (24.3)	3.4	-	-	37.5	59.1
HBO (27.1)	2.0	-	-	33.0	65.3
WO (27.6)	1.9	-	-	19.0	79.1
Chi-square statistic (df=3)	2.2	-	-	42.2**	45.4**
Sex					
Male (49.2)	2.3	-	-	26.7	70.9
Female (50.8)	2.5	-	-	36.6	60.8
Chi-square statistic (df=1)	0.1	-	-	14.8**	14.9**
All (100.0)	2.4	-	-	31.8	65.8

Source: RUBS 1998
-: not applicable
* = $p < 0.05$; ** = $p < 0.01$

Table 2 shows that, once the choice for HBO or WO has been made, the choice of a field of education is only loosely related to the social background of HAVO and VWO pupils. For HAVO pupils who started in HBO, the differences amounted to no more than a few percentage points, regardless of the field of education chosen. For example, 16 per cent of all HAVO pupils with parents at the lowest educational level chose behaviour/society, against 13 per cent of those with highly educated parents. For VWO graduates who continued in HBO, there were a few interesting differences in study choices related to social background. The greatest differences were in art/language/culture, engineering, and education, which were chosen more often by VWO pupils with highly educated parents than by their counterparts with lower educated parents. For example, 15 per cent chose a course of studies in the field of art/language/culture among those whose parents had a university degree, against a mere 1 per cent among those whose parents reached no more than LO/LBO/MAVO. Studies in health were also chosen more often by VWO pupils with university-educated parents than by their counterparts with lower educated parents. For the fields of behaviour/society and economics, on the contrary, we found a negative relationship with the parents' education level. Fewer VWO pupils with highly educated parents than those with lower educated parents chose courses in these fields of study within HBO. For VWO pupils who continued in WO – like HAVO pupils who went to HBO – there were few differences related to social background as regards the choice of field of education. Here, too, the differences amounted to no more than a few percentage points. The greatest differences were in the fields of law/public order and economics. Both fields were chosen less often by pupils with highly educated parents.

Differences between men and women in the choice of a field of education were stronger than differences between social strata. The sex differences in the field of education chosen were more or less the same for the different modes of transition from secondary to tertiary education. The results indicate a disproportionate number of men in engineering, meaning that the likelihood of choosing to study engineering is higher for men than for women. To a much lesser extent, the same held for the field of economics (with the exception of those who continued in HBO after VWO). Women, on the other hand, were particularly over-represented in the fields of behaviour/society, health, and education.

We now look at the relationship between social background and sex, on the one hand, and the ability of pupils, on the other. In Table 3, we set the final exam marks for the Dutch language and mathematics obtained by pupils against the parents' level of education and sex. Table 3 shows that HAVO pupils with highly educated parents had, on average, a slightly higher final mark for the Dutch language than did HAVO pupils with lower educated parents. Eight per cent of HAVO pupils with university-educated parents had an 8 or higher, against 5 per

Table 2: *Choice of field of higher education made by pupils from HAVO and VWO by parents' level of education and sex: Percentages*

	Field of education								
	Agri-culture	Educa-tion	Beha-viour & Society	Eco-nomics	Health	Art, Lang. & Culture	Law & Public order	Natural sciences	Engi-neering
HAVO - HBO									
Parents' level of education									
LO/LBO/MAVO (31.2)	4.2	21.7	15.7	22.8	14.9	3.1	0.3	-	17.3
MBO/HAVO/VWO (28.2)	2.6	17.3	13.3	30.1	12.1	3.8	0.3	-	20.5
HBO (28.2)	4.6	18.2	15.0	28.6	12.7	4.9	0.0	-	15.9
WO (12.3)	4.6	19.9	12.6	27.2	11.3	4.6	0.0	-	19.9
Chi-square statistic (df=3)	2.3	2.6	1.4	5.6	1.9	1.7	1.4	-	3.0
Sex									
Male (43.6)	5.4	12.2	4.5	34.8	6.2	4.1	0.2	-	32.6
Female (56.4)	2.6	24.6	22.3	20.9	18.6	3.8	0.1	-	7.1
Chi-square statistic (df=1)	6.5*	30.2**	77.0**	29.6**	40.5**	0.1	0.0	-	131.1**
All (100.0)	3.8	19.2	14.5	27.0	13.2	3.9	0.2	-	18.2
VWO - HBO									
Parents' level of education									
LO/LBO/MAVO (26.4)	4.5	1.8	14.5	41.8	8.2	0.9	1.8	-	26.4
MBO/HAVO/VWO (28.8)	3.4	7.5	10.0	48.3	6.7	2.5	5.8	-	15.8
HBO (28.6)	1.7	6.7	7.6	35.3	8.4	8.4	5.9	-	26.1
WO (16.1)	3.0	9.0	9.0	35.8	13.4	14.9	4.5	-	10.4
Chi-square statistic (df=3)	1.5	5.1	3.1	4.7	2.6	18.8**	2.9	-	10.3*
Sex									
Male (41.3)	2.4	2.9	2.9	37.6	2.9	2.9	7.6	-	40.6
Female (58.7)	3.7	7.9	15.7	43.8	12.8	7.0	2.1	-	7.0
Chi-square statistic (df=1)	0.6	4.4*	17.4**	1.7	12.3**	3.3	7.4**	-	67.9**
All (100.0)	3.2	5.8	10.4	41.3	8.7	5.3	4.4	-	20.9

VWO - WO									
Parents' level of education									
LO/LBO/MAVO (18.1)	0.0	-	16.2	19.5	13.0	10.4	16.9	10.4	13.6
MBO/HAVO/VWO (22.1)	2.1	-	19.7	16.5	9.0	6.4	16.5	10.6	19.1
HBO (26.7)	1.8	-	22.0	16.3	12.8	11.5	10.1	8.8	16.7
WO (33.1)	1.8	-	16.7	15.2	15.6	7.4	12.8	11.0	19.5
Chi-square statistic (df=3)	3.0	-	3.2	1.3	4.3	4.5	5.2	0.7	2.8
Sex									
Male (53.1)	0.7	-	12.4	23.7	9.3	4.9	11.7	11.7	25.7
Female (46.9)	2.5	-	25.8	8.5	16.8	13.3	15.8	8.5	8.8
Chi-square statistic (df=1)	4.8*	-	25.1**	35.4**	10.5**	18.7**	3.0	2.4	41.4**
All (100.0)	1.5	-	18.7	16.6	12.9	8.8	13.6	10.2	17.6

Source: RUBS 1998

-: not applicable

* = $p < 0.05$; ** = $p < 0.01$

cent of those whose parents completed their education at LO/LBO/MAVO level. The percentage of pupils whose final mark for the Dutch language was 6 was smaller among those whose parents had a university level education than among those whose parents were educated at the lowest level (LO/LBO/MAVO). In addition, it appears that HAVO pupils with highly educated parents obtain lower rather than higher final exam marks for mathematics than those with lower educated parents. The differences, however, were minimal. Table 3 also shows that, in VWO, there was a fairly strong relationship between the educational level of the parents and the final mark for the Dutch language. Almost one fifth of all VWO pupils with university-educated parents obtained an 8 or higher, whereas the corresponding percentage among those whose parents reached a level of LO/LBO/MAVO was 8 per cent. A similar difference was found among those who obtained a 7 as their final mark for the Dutch language. The reverse was found in VWO pupils who obtained a 6 for the Dutch language. Fewer VWO pupils with the highest educated parents (WO) than those with the lowest educated parents (LO/LBO/MAVO) had a 6 as final mark The shares were 26 and 46 per cent, respectively. Furthermore, Table 3 shows that VWO pupils with highly educated parents had higher marks for mathematics than did those with lower educated parents. The differences were slightly smaller than in the case of the mark for the Dutch language. For example, 23 per cent of pupils whose parents were educated at university level obtained an 8 or higher against 15 per cent of those whose parents reached LO/LBO/MAVO. In addition, fewer VWO pupils with highly educated parents

failed mathematics than those with lower educated parents. The difference between the highest and lowest educated parents was 5 percentage points (17 - 12 per cent).

With respect to sex differences, the results of Table 3 show that female pupils from HAVO or VWO had a higher mark for the Dutch language than did their male counterparts. In VWO, for instance, less than 1 per cent of the women failed in the Dutch language, whereas 5 per cent of men did. About 20 per cent of the women obtained an 8 or higher for the Dutch language against 9 per cent of the men. Regarding the examination results for mathematics, the opposite was found: men had a higher final exam mark for mathematics than did women. Once again, this finding holds for both HAVO and VWO.

Table 4 shows to what extent the social background of the pupils was related to the set of subjects taken. The results indicate that this was hardly the case for HAVO. In fact, there was a noticeable difference only in the set of subjects that matched the economics/society subjects. Fewer HAVO pupils with highly educated parents than those with lower educated parents chose this set of subjects: 32 per cent of pupils with parents who had an academic degree, and 37 per cent of pupils with parents who were educated at the lowest level. In VWO, on the other hand, there were fairly large differences in social background as regards the set of subjects taken. Firstly, there appeared to be a positive relationship between the educational level of the parents and the chance of taking the nature/science subjects. Forty-five per cent of VWO pupils with the highest educated parents, and 32 percent of those with the lowest educated parent chose these subjects. It also appears that – as in the case of HAVO pupils – fewer VWO pupils with highly educated parents than those with lower educated parents chose the economics/society subjects. The maximum difference was 16 percentage points (36 - 20 per cent).

Gender inequalities regarding the set of subjects taken were also found. More male than female pupils chose the nature/science study profile. In HAVO, the difference was 22 percentage points (31 - 9 per cent); in VWO, the difference was 29 per cent. Female pupils, on the other hand, were more likely to choose the nature/health, culture/society, or economics/society subjects than men. With respect to the latter study profile, the sex difference was significant in VWO only.

Are the effects of social background and sex direct or indirect?

Having established the differentiation by social background and sex following secondary education, we investigated to what extent this differentiation was already initiated in secondary education. We consider it likely that this was the case. Tables 3 and 4 have shown that there was a link between the parents' level of education and sex, on the one hand, and the final exam marks obtained and

Table 3: *Examination results obtained for the Dutch language and mathematics by pupils from HAVO and VWO by parents' level of education and sex: Percentages*

	Examination results for Dutch language				Examination results for mathematics			
	4 or 5	6	7	8, 9 or 10	4 or 5	6	7	8, 9 or 10
HAVO								
Parents' level of education								
LO/LBO/MAVO (32.0)	4.3	49.1	42.1	4.5	4.6	18.6	53.4	23.4
MBO/HAVO/VWO (29.4)	5.2	47.9	42.6	4.3	4.7	20.0	55.3	20.0
HBO (26.4)	4.3	46.1	43.9	5.6	6.3	19.9	53.1	20.7
WO (12.2)	3.3	41.8	46.9	8.0	6.6	20.7	49.3	23.5
Chi-square statistic (df=3)	1.5	3.7	1.5	5.0	2.4	0.6	2.2	2.4
Sex								
Male (44.2)	7.6	61.2	27.7	3.5	4.8	18.5	48.7	28.0
Female (55.8)	1.9	36.0	55.7	6.3	5.7	20.6	57.0	16.7
Chi-square statistic (df=1)	32.8**	110.0**	138.7**	7.3**	0.8	1.2	11.6**	32.8**
All (100.0)	4.5	47.1	43.3	5.1	5.3	19.6	53.3	21.7
VWO								
Parents' level of education								
LO/LBO/MAVO (21.0)	2.9	45.8	43.6	7.6	17.0	38.0	29.7	15.2
MBO/HAVO/VWO (24.3)	1.9	33.2	53.9	11.0	14.1	40.9	27.2	17.8
HBO (27.1)	4.5	28.9	49.6	17.1	14.0	37.2	29.1	19.8
WO (27.6)	1.7	26.2	53.4	18.7	11.5	32.1	33.5	22.8
Chi-square statistic (df=3)	6.6	30.5**	7.9*	21.3**	3.9	5.8	3.6	6.5
Sex								
Male (49.2)	4.6	46.5	40.4	8.5	10.8	31.4	33.5	24.3
Female (50.8)	0.9	19.4	59.9	19.7	16.9	42.3	26.5	14.2
Chi-square statistic (df=1)	17.3**	109.6**	49.8**	34.0**	10.1**	16.9**	7.5**	21.5**
All (100.0)	2.7	32.7	50.3	14.2	13.9	36.9	30.0	19.1

Source: RUBS 1998

* = $p < 0.05$; ** = $p < 0.01$

Table 4: *Set of subjects taken by pupils from HAVO and VWO by parents' level of education and sex: Percentages*

	Set of subjects				
	Nature & Science	Nature & Health	Economics & Society	Culture & Society	Other
HAVO					
Parents' level of education					
LO/LBO/MAVO (32.0)	19.0	10.4	37.4	11.3	22.0
MBO/HAVO/VWO (29.4)	18.4	12.8	39.0	9.3	20.5
HBO (26.4)	18.0	10.6	34.0	11.0	26.4
WO (12.2)	21.0	11.7	32.2	12.6	22.4
Chi-square statistic (df=3)	1.0	1.9	4.5	2.1	5.1
Sex					
Male (44.2)	30.8	8.3	35.1	3.9	22.0
Female (55.8)	9.2	13.7	37.4	16.2	23.4
Chi-square statistic (df=1)	130.6**	12.7**	1.0	68.0**	0.5
All (100.0)	18.8	11.3	36.3	10.8	22.8
VWO					
Parents' level of education					
LO/LBO/MAVO (21.0)	32.2	13.4	35.5	10.9	8.0
MBO/HAVO/VWO (24.3)	34.8	12.2	31.0	16.3	5.6
HBO (27.1)	39.8	12.6	28.6	12.0	7.0
WO (27.6)	45.2	11.8	19.8	13.2	9.9
Chi-square statistic (df=3)	13.8**	0.4	21.0**	4.4	4.8
Sex					
Male (49.2)	53.3	8.0	25.2	4.6	8.8
Female (50.8)	24.3	16.6	31.0	21.3	6.7
Chi-square statistic (df=1)	115.8**	22.1**	5.6*	80.7**	2.0
All (100.0)	38.5	12.5	28.2	13.2	7.7

Source: RUBS 1998

* = $p < 0.05$; ** = $p < 0.01$

the set of subjects taken, on the other hand. The question was, however, to what extent the observed effects of social background and sex on study choices can be attributed to differences in final exam marks and set of subjects taken between various social strata and between men and women. To answer this question, we applied a multivariate analysis to the data, in which the effects of the parents' level of education and sex on the horizontal and vertical study choices of pupils were estimated, without controlling for the effects of the final exam marks and the set of subjects taken and with controlling for these effects.[4] The age variable was added in all models as a covariate.[5]

Table 5 presents the results of the multinomial logistic regression analysis of the choice in favour of subsequent education following HAVO. The results of this multivariate analysis show the effects of different independent variables on the odds of choosing a subsequent course of studies in MBO in relation to the odds of making a different choice (no subsequent study, HBO, or VWO). Model 1 shows that the social background of the pupils had an impact on their choice of subsequent education. Compared with those with lower educated parents, HAVO pupils with highly educated parents more often chose HBO or VWO. The social background effect on the choice of VWO was almost three times as large as that on the choice of HBO. In addition, Model 1 shows that age had a significant effect on the choice of a subsequent course of studies after HAVO. Older pupils decided more often not to follow any subsequent course of studies than did younger ones. In addition, older HAVO pupils less often decided to continue in VWO. These age related findings are probably connected with the fact that older HAVO pupils are less talented and, therefore, more often had to repeat classes.

Model 2 shows that the effect of social background on the choice of subsequent education continued to exist after the final exam marks and the set of subjects were taken into account. The regression coefficients belonging to the parents' level of education did not, or hardly, decrease. For VWO, the estimated parameter dropped from 0.395 in Model 1 to 0.364 in Model 2. This decrease implies a reduction of the effect of social background of approximately 8 per cent (1 - 0.364 / 0.395). This means that the largest part of the effect of social background on the choice of subsequent education was a direct effect. The final exam marks and the set of subjects taken also had an effect on the choice of subsequent education among HAVO pupils. The results show that the final exam marks were important for the choice of courses of study in HBO or VWO. Pupils with high final exam marks more often than pupils with low final exam marks chose these studies. Moreover, a comparative advantage in the Dutch language compared with mathematics was important. It appears that pupils who had an advantage in the Dutch language compared with mathematics were more likely to choose HBO. The set of subjects examined at HAVO was also relevant to the choice of HBO and VWO. HAVO pupils who have chosen a set of nature/science subjects more often choose HBO or VWO.

Table 5: *Results of multinomial logit analysis of the choice of subsequent education following HAVO: Logit effects*

	1			2		
	None[a]	HBO[a]	VWO[a]	None[a]	HBO[a]	VWO[a]
Intercept	-2.138**	0.643**	-2.748**	-0.275	-2.687**	-6.169**
Parents' level of education	0.102	0.135**	0.395**	0.102	0.135**	0.364**
Sex						
Male	ref.	ref.	ref.	ref.	ref.	ref.
Female	0.227	0.049	-0.269	0.322	0.154	-0.009
Age	0.387**	0.040	-0.566**	0.327**	0.054	-0.455**
Examination results				-0.111	0.305**	0.335**
Comparative advantage				-0.021	0.160*	0.095
Set of subjects						
Nature & Science				ref.	ref.	ref.
Nature & Health				-0.880	-0.587*	-1.167*
Economics & Society				-0.386	-1.078**	-1.218**
Culture & Society				-0.496	-1.189**	-1.762**
Other				-0.143	-0.614*	-0.815*
Model Chi-square	77.0**			143.9**		
Df	9			27		
N	1,637			1,637		

Source: RUBS 1998

[a] = compared with the choice of MBO

ref. = reference category

* = $p < 0.05$; ** = $p < 0.01$

Table 6 shows similar results to those in Table 5, but this time for VWO pupils. The choices were defined differently here. This time the choice was between no subsequent education or WO, or HBO. Model 1 indicates that social background played a role in the choice between HBO and WO. Significantly more pupils with highly educated parents chose an academic course of studies than those with lower educated parents. Model 1 also shows that fewer female VWO pupils than their male counterparts chose an academic course of studies. The estimated odds ratio was approximately 0.6 ($e^{-0.531}$). Model 1 furthermore shows that age had a significant effect. VWO pupils, who were older, had a

greater chance of doing no subsequent studies than had younger ones. For each extra year of age, the odds of not studying – relatively in comparison with choosing HBO – increased by 80 per cent ($e^{0.590}$). In addition, older VWO pupils appeared to prefer HBO to WO. Once again, these findings seem to indicate that older pupils were less talented and, therefore, more often repeated classes.

Model 2 again shows that the effect of social background on the choice of a subsequent course of studies remained largely intact after the effects of final exam marks and set of subjects taken were controlled for. The reduction of the social background effect in the choice for WO was approximately 14 per cent (1 - 0.132 / 0.153). Also, the sex effect for WO continued to exist to a large extent after the final exam marks and the set of subjects taken were controlled for. The estimated parameter dropped from -0.531 in Model 1 to -0.434 in Model 2. This decrease implies a reduction of the sex effect of 18 per cent (1 - -0.434 / -0.531).

Model 2 furthermore shows that the final exam marks had a positive effect on the choice of WO: more VWO pupils with high examination results than their counterparts with low examination results chose WO. Lastly, the set of subjects taken in VWO had an effect on the subsequent form of education. More pupils who had a set of subjects that fits within the nature/science study profile than those with a set of subjects that fits in a different study profile decided to take an academic course of studies.

Of those who decided to enter higher education, we determined to what extent the choice of a particular field of education in HBO or WO was related to social background and sex and, to what degree the effects of social background and sex could be explained by taking into account the final exam marks and the set of subjects taken. The latter was established by comparing the size of the effects of social background and sex using a model that did and a model that did not control for the final exam marks and the set of subjects taken.

Table 7 presents the results of a multinomial logit analysis of the choice of a field of education in HBO among HAVO pupils. Model 1 shows that the choice of a particular field of education in HBO was not dependent on the social background of pupils, because no effect of the parents' level of education was significant. The results of Model 1 also show that women – with the exception of the field of law/public order – chose a field of education other than engineering significantly more often than men. For instance, the odds of choosing behaviour/society versus engineering were more than 23 ($e^{3.174}$) times greater for women than the corresponding odds for men. In addition, HAVO pupils who chose a course of studies in behaviour/society were generally older than those who chose a course of studies in the field of engineering.

Table 6: *Results of multinomial logit analysis of the choice of subsequent education following VWO: Logit effects*

	1		2	
	None[a]	WO[a]	None[a]	WO[a]
Intercept	-3.068**	0.277	-1.058	-2.237**
Parents' level of education	0.024	0.153**	0.036	0.132**
Sex				
Male	ref.	ref.	ref.	ref.
Female	-0.035	-0.531**	-0.166	-0.434**
Age	0.590**	-0.303**	0.424*	-0.135
Examination results			-0.150	0.219**
Comparative advantage			0.038	0.080
Set of subjects				
Nature & Science			ref.	ref.
Nature & Health			0.330	-0.465*
Economics & Society			0.276	-0.678**
Culture & Society			0.288	-0.674**
Other			0.275	-0.869**
Model Chi-square	79.2**		139.2**	
Df	6		18	
N	1,429		1,429	

Source: RUBS 1998

[a] = compared with the choice of HBO

ref. = reference category

* = $p < 0.05$; ** = $p < 0.01$

Model 2 shows that differences between male and female HAVO pupils in the choice of a field of education in HBO were explained to a reasonable extent by the examination results and the set of subjects taken. The reduction in the effect size varied from 21 per cent for the field of law/public order (1 - 0.884 / 1.112) to 61 per cent for the field of economics (1 - 0.389 / 0.997). Therefore, a significant part of the total effect of sex ran indirectly through the final examination results and the set of subjects taken. Furthermore, Model 2 shows that the final exam marks and the set of subjects taken by HAVO pupils were important for the choice of a particular field of education in HBO. Pupils with a compar-

ative advantage in the Dutch language compared with mathematics more often chose a course of studies in the field of education or behaviour/society. With respect to the set of subjects, HAVO pupils in general followed a course of studies in HBO that matched the set of subjects taken in secondary education. On the one hand, pupils with a set of subjects in the nature/science profile chose technical studies; on the other hand, those with a set of subjects that fits in the culture/society profile most often chose a course of study in the fields of education or behaviour/society.

Table 8 shows similar results for VWO pupils who went to HBO. Model 1 indicates that social background had a positive effect as regards the choice of the fields of education and art/language/culture. Generally, fewer VWO pupils with highly educated parents than those with lower educated parents choose a subsequent course of studies in HBO – as shown in Table 6 –, but when the first group did, it usually concerned a cultural studies in HBO. With respect to gender differences in the choice of a field of education in HBO, the results for pupils from VWO and HAVO hardly deviated from each other. Again, significantly more women than men– with the exception of law/public order – chose course of studies other than engineering. The age effect was again only present in the field of behaviour/society. Older VWO pupils chose this field of education more often than younger pupils.

Model 2 shows that – as was the case for the choice of a particular level of education – the effect of social background on the choice of a particular field of education within HBO remained largely intact after differences in the examination results and the set of subjects taken by pupils were taken into account. When we compared the choices of a field of education made by VWO pupils with similar final exam marks and the same set of subjects, we found that more pupils with highly educated parents than those with lower educated parents chose a study in art/language/culture. The sex effect, in contrast, was explained to a considerable extent by the final examination results and the set of subjects taken. The reduction in the sex effect varied from 17 per cent for the field of health to 41 per cent for the field of agriculture. In addition, Model 2 shows that VWO pupils – like HAVO ones – with a comparative advantage in the Dutch language compared with mathematics more often chose a study in the field of behaviour/society. They also chose an HBO study that matched their set of subjects in secondary education. Thus, pupils with a set of subjects that fits within the nature/science study profile most often chose technical studies, and those with a set of subjects that fits within the economics/society profile most often chose economic studies.

Table 7: *Results of multinomial logit analysis of the choice of field of education in HBO following HAVO: Logit effects*

	1							2						
	Agri-culture[a]	Educa-tion[a]	Beha-viour & Society[a]	Eco-nomics[a]	Health[a]	Art, Lang. & Culture[a]	Law & Public order[a]	Agri-culture[a]	Educa-tion[a]	Beha-viour & Society[a]	Eco-nomics[a]	Health[a]	Art, Lang. & Culture[a]	Law & Public order[a]
Intercept	-1.792**	-1.054**	-2.290**	-0.101	-1.767**	-2.827**	-3.733*	-4.160*	-2.463	-3.341*	-2.262	-2.678	-3.664	-2.710
Parents' level of education	0.010	-0.003	-0.001	0.044	-0.014	0.109	-0.289	-0.005	-0.038	-0.030	0.024	-0.028	0.063	-0.094
Sex														
Male	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Female	0.723*	2.224**	3.174**	0.997**	2.656**	1.452**	1.112	0.458	1.346**	2.268**	0.389	2.010**	0.728*	0.884
Age	-0.011	0.095	0.264*	-0.059	0.153	0.195	0.329	0.016	-0.041	0.152	-0.120	0.067	0.046	0.036
Examination results								0.171	0.030	-0.016	0.064	0.034	0.024	-0.065
Comparative advantage								0.159	0.343**	0.348**	0.137	0.202	0.257	0.134
Set of subjects														
Nature & Science								ref.	ref.	ref.	ref.	ref.	ref.	ref.
Nature & Health								1.832**	2.122**	2.066**	1.143**	2.234**	1.028	0.950
Economics & Society								0.282	3.026**	3.702**	3.492**	1.717**	2.742**	1.655
Culture & Society								0.887	4.579**	4.499**	3.809**	2.461**	4.008**	2.742
Other								-0.088	2.158**	2.288**	1.728**	1.051**	1.715**	0.799
Model Chi-square	262.6**							636.6**						
Df	21							63						
N	1,144							1,144						

Source: RUBS 1998

[a] = compared with the choice of engineering

ref. = reference category

* = $p < 0.05$; ** = $p < 0.01$

The results of the multivariate analysis of the choice of a particular field of education in WO are presented in Table 9. Model 1 shows that the level of education of VWO pupils' parents had no effect on the choice of a particular field of education in WO. In addition, this model shows that significantly more women than men– with the exception of the field of economics – chose another field of education than engineering. The sex effect was greatest in agriculture. The estimated odds ratio here was around 10 ($e^{2.313}$). Model 1 also shows that the age of VWO pupils was a determining factor for the choice of a field of education at university. Compared with VWO graduates who started courses of studies in engineering, those who followed a course of studies in behaviour/society, economics, health, law/public order, or natural sciences were slightly older.

Model 2 indicates again that a relatively large part of the sex differences can be explained by differences between men and women in the examination results and the set of subjects taken. The reduction in the effect size was largest in the field of law/public order (69 per cent), and smallest in the field of health (20 per cent). Furthermore, Model 2 clearly shows that the examination results were guiding principles for the field of education chosen within WO. Pupils with high examination results were relatively more likely to choose art/language/culture. In addition, pupils who were comparatively good in the Dutch language – as compared with mathematics – were more likely to be found in behaviour/society, art/language/culture, or law/public order, than in engineering. Lastly, the set of subjects at the final exam in VWO – as was the case in continuing to HBO – was of great importance for the choice of the field of education in WO. A nature/science study profile was usually followed by a course of studies in natural sciences or engineering, whereas a culture/society or economics/society study profile generally led to a course of studies in behaviour/society, economics, art/language/culture, or law/public order.

Table 8: *Results of multinomial logit analysis of the choice of field of education in HBO following VWO: Logit effects*

	1							2						
	Agri-culture[a]	Educa-tion[a]	Beha-viour & Society[a]	Eco-nomics[a]	Health[a]	Art, Lang. & Culture[a]	Law & Public order[a]	Agri-culture[a]	Educa-tion[a]	Beha-viour & Society[a]	Eco-nomics[a]	Health[a]	Art, Lang. & Culture[a]	Law & Public order[a]
Intercept	-2.205*	-4.132**	-2.843**	-0.382	-3.251**	-6.597**	-3.124**	-5.862	-2.182	-4.424	-1.724	-1.851	-5.060	-3.948
Parents' level of education	-0.125	0.284*	-0.070	0.030	0.126	0.630**	0.246	-0.136	0.291*	-0.060	0.057	0.094	0.533**	0.178
Sex														
Male	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Female	2.165**	2.724**	3.622**	1.992**	3.200**	2.688**	0.540	1.284	2.108**	2.562**	1.265**	2.644**	1.853**	0.338
Age	0.110	-0.132	0.735**	0.200	-0.015	0.131	0.112	0.012	-0.289	0.529	0.015	-0.135	0.042	0.120
Examination results								0.232	-0.170	0.043	-0.020	-0.123	-0.082	0.090
Comparative advantage								0.077	0.063	0.430*	0.144	0.075	0.171	0.332
Set of subjects														
Nature & Science								ref.	ref.	ref.	ref.	ref.	ref.	ref.
Nature & Health								2.662**	0.589	1.627*	1.105*	1.403*	0.894	0.052
Economics & Society								1.891*	1.942**	2.514**	3.337**	1.193	1.188	-0.572
Culture & Society								1.948	1.892*	3.072**	3.330**	1.657	2.624**	1.295
Other								-0.030	-1.362	2.510**	2.036**	1.509*	0.633	1.151
Model Chi-square	153.8**							307.7**						
Df	21							63						
N	456							456						

Source: RUBS 1998

[a] = compared with the choice of engineering

ref. = reference category

* = $p < 0.05$; ** = $p < 0.01$

Table 9: *Results of multinomial logit analysis of the choice of field of education in WO following VWO: Logit effects*

	1							2						
	Agri-culture[a]	Beha-viour & Society[a]	Eco-nomics[a]	Health[a]	Art, Lang. & Culture[a]	Law & Public order[a]	Natural scien-ces[a]	Agri-culture[a]	Beha-viour & Society[a]	Eco-nomics[a]	Health[a]	Art, Lang. & Culture[a]	Law & Public order[a]	Natural scien-ces[a]
Intercept	-4.169**	-0.994*	0.180	-1.465**	-1.376**	-0.716	-0.875	-6.036*	-3.482*	-2.957*	-3.650*	-6.562**	-3.038	-2.618
Parents' level of education	0.091	-0.010	-0.069	0.038	-0.067	-0.085	-0.024	0.040	0.005	-0.043	0.037	-0.052	-0.062	-0.021
Sex														
Male	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Female	2.313**	1.953**	0.127	1.742**	2.141**	1.576**	0.867**	1.374*	0.845**	-0.257	1.395**	0.772*	0.483	0.624*
Age	0.169	0.705**	0.421*	0.527*	0.315	0.863**	0.557*	0.230	0.348	0.287	0.555*	-0.003	0.469*	0.564*
Examination results								0.179	0.102	0.181	0.159	0.281*	0.072	0.125
Comparative advantage								0.270	0.445**	0.037	0.184	0.591**	0.504**	0.120
Set of subjects														
Nature & Science								ref.	ref.	ref.	ref.	ref.	ref.	ref.
Nature & Health								1.777**	2.331**	0.408	1.133**	2.617**	2.269**	1.066*
Economics & Society								2.491*	4.999**	4.315**	1.440	5.666**	5.406**	0.959
Culture & Society								2.785*	4.977**	3.006*	1.345	5.575**	4.945**	1.114
Other								1.263	2.148**	0.811	-0.169	-0.412	2.218**	-0.141
Model Chi-square	167.1**							666.8**						
Df	21							63						
N	917							917						

Source: RUBS 1998

[a] = compared with the choice of engineering

ref. = reference category

* = $p < 0.05$; ** = $p < 0.01$

Conclusion

In this study, we investigated the effects of social background and sex on the choice of subsequent education among HAVO and VWO pupils. To provide a good overview, we made a distinction between vertical and horizontal differences in study choices. Vertical differences relate to the choice of a particular level of education; horizontal differences relate to the choice of a particular field of education. In addition to examining this differentiation by social background and sex following secondary education, we investigated to what extent this differentiation in study choices can be attributed to the variation in final exam marks and the set of subjects taken between pupils from different social strata and between male and female pupils. This provided insight into the extent to which the effects of social background and sex are indirect, and social and gender inequalities must be sought in secondary education, or direct, affecting the choices made after completing secondary education. To test our hypotheses empirically, we used data on 3,066 HAVO and VWO pupils. The results of this empirical analysis can be summarized as follows.

The social background of pupils has a clear effect on the choice of a course of studies after secondary education. HAVO pupils with highly educated parents have a relatively great chance of continuing into vocational college (HBO) or pre-academic secondary education (VWO), and a relatively small chance of continuing into middle-level vocational training (MBO). VWO pupils with highly educated parents have a relatively great chance of going to university (WO), instead of vocational college. The choice of a particular field of education in higher education is affected by social background only to a limited extent. Among VWO pupils who go to vocational college, the social background of the pupils has an effect on the choice of a particular field of education. We found that VWO pupils with highly educated parents have a relatively great chance of choosing a cultural study in vocational college.

The effect of social background on study choice that we found only can be attributed to a limited extent to differences in final exam marks and the set of subjects taken between pupils from various social strata. It has been shown that the effect of social background on the choice of a particular level of education and a particular field of education remains largely intact, even after differences in the examination results and the set of subjects taken by pupils have been taken into account. This renders the effect of social background on the choice of a subsequent course of studies largely a direct one, and hence social inequality must be sought in the choices made after secondary education, rather than in secondary education.

With respect to sex differences, we first of all conclude that more male than female VWO pupils choose an academic study. In addition, women are more likely than men to be found in the fields of behaviour/society, health, and edu-

cation, as opposed to technical and – to a lesser extent – economic studies. To a reasonable extent, these sex differences in the choice of subsequent education can be explained by differences between men and women in the examination results and the set of subjects taken. This implies that a significant part of the total effect of sex runs indirectly through the final examination results and the set of subjects taken in secondary education.

The final exam marks and the set of subjects have a considerable effect on study choices after secondary education. With respect to the choice of a particular level of education, the results of the analysis show that pupils with a nature/science study profile or high final exam marks, or both, are more likely to choose vocational college after HAVO, or university after VWO, than are those with a different set of subjects or low final exam marks. The latter group of pupils more often chooses no subsequent course of studies or one at a lower level than is possible on the basis of the diploma obtained in secondary education. With respect to the choice of a particular field of education in higher education, we found that pupils who have completed HAVO and VWO generally choose a course of studies in higher education that matches the set of subjects taken in secondary education. In addition, those who are comparatively good in the Dutch language – as compared with mathematics – particularly favour the fields of behaviour/society, education, art/language/culture, or law/public order, rather than engineering.

Our conclusion that most of the social and sex differentiation regarding the transition to tertiary education is due to differences in the decisions of HAVO and VWO pupils, and not to differences in their examination results and subjects taken in secondary education, requires clarification. Although we found that examination results did affect the decision to go to either vocational college or university, and that the subjects taken in secondary school did affect the field of study in tertiary education, the effects of social background, and to a lesser extent, the effects of sex were independent of the examination results and subjects taken. It is likely that the nearly complete absence of entrance examinations or other strict requirements with regard to entry into tertiary education in the Netherlands plays an important role here. It is hardly an overstatement that pupils who finish upper secondary education are entitled to enter almost all fields in higher education. A notable exception at the level of vocational colleges is art education (music conservatory, theatre academy), where entrance examinations exist. Exceptions at university level are medicine and veterinary, where there is a surplus of student supply and where entrance is partially dependent on examination results. Generally, however, pupils and their parents can decide themselves what level and field of tertiary education they enter. The absence of meritocratic regulations makes room for effects of ascriptive characteristics. An interesting question is which implications the ascriptive effects of social background during the transition to tertiary education have for the relationship between social background and final educational attainment in the

Netherlands. At first sight, one might think that the ascriptive effects increase the impact of social background, but there may be compensatory mechanisms at work here. As shown in Tables 3 and 4, the association between social background, on the one hand, and examination results and subjects taken, on the other hand, is relatively weak in the Netherlands. In the current situation, completing upper secondary education is sufficient to warrant entrance into any type of tertiary education. We think, however, that if there were be more formal requirements regarding access to tertiary education, pupils might do what is needed to maximize their educational chances. They can accomplish this by using the resources they have to enhance their examination results. In this case ascription would take place within secondary education, whereas at present ascription occurs in the transition from secondary to tertiary education.

NOTES

1 A large part of social inequality in educational attainment is based on earlier stages of the educational career, especially in the development of talent within primary education and in the transition from primary to secondary education. These sources of educational inequality were not investigated in this study, as we focused on educational decisions made in (and just after) secondary education. Our analysis was conditional upon decisions made earlier in the educational career. In other words, we looked at the effects of social background and sex on the choices within higher education for those who had already made the transition from primary to higher secondary education.

2 Schools participate on a voluntary basis in the RUBS survey. If the sample does not cover all types of education available in the Dutch system of secondary education within regions, an additional sample of schools is drawn to reach this coverage. In 1998, for instance, an additional sample of schools for upper secondary general education in the eastern part of the Netherlands was approached to take part in the survey. Moreover, to obtain nationally representative results, the data set is weighted on the basis of population figures with respect to type of education, region, and sex. For a more detailed description of the methodology used in the RUBS survey, we refer to Huijgen and Wolbers (1999).

3 The transition from VWO to MBO is also possible, but in practise this is not a real option. In the data set used, only eight pupils from VWO chose MBO and, therefore, we decided not to analyse this transition.

4 Although (especially in VWO) the examination results and the set of subjects taken were interrelated – pupils with a nature/science study profile had the highest marks in mathematics, whereas those with a culture/society study profile had the highest marks in the Dutch language –, we decided to present only a model in which the effects of examination results were estimated net of subjects and vice versa. The main argument for this decision is that the emphasis in this study is on the explanation of social background and sex effects on study choices in tertiary education, rather than on the (in)direct effects of examination results and subjects on these study choices.

5 In the multivariate analysis, we also tested for possible statistical interactions between social background and sex, on the one hand, and the other independent variables in the model, on the other hand, despite the fact that we did not formulate explicit hypotheses regarding these interactions. Since no substantial interaction effects were found in the analysis – probably as a result of the rather small number of respondents concerned in the various regressions –, we decided not to report (the absence of) these interaction effects.

REFERENCES

Bosma, H. & Cremers, P. (1996). Sociaal-economische verschillen bij de doorstroom naar de universiteit [Socio-economic differences and the transition to university]. *Mens en Maatschappij, 71*, 142-153.

Boudon, R. (1974). *Education, Opportunity, and Social Inequality*. New York: Wiley.

Bourdieu, P. (1973). Cultural reproduction and social reproduction. In: R Brown (Ed.), *Knowledge, education and cultural change*. London: Tavistock.

Breen, R. & Goldthorpe, J. (1997). Explaining educational differentials: Towards a formal rational action theory. *Rationality and Society, 9*, 275-305.

De Graaf, N.D. & De Graaf, P.M. (2002). Formal and popular dimensions of cultural capital: Effects on children's educational attainment. *The Netherlands' Journal of Social Sciences, 38*, 167-186.

De Graaf, N.D., De Graaf, P.M. & Kraaykamp, G. (2000). Parental cultural capital and educational attainment in the Netherlands: A refinement of the cultural capital perspective. *Sociology of Education, 73*, 92-111.

De Graaf, P.M. & Ganzeboom, H.B.G. (1990). Educational mobility in the Netherlands: Birth cohorts 1891 to 1960. *The Netherlands' Journal of Social Sciences, 26*, 35-50.

De Graaf, P.M. & Ganzeboom, H.B.G. (1993). Family background and educational attainment in the Netherlands for the 1891-1960 birth cohorts. In: Y. Shavit & H.P. Blossfeld (Eds.), *Persistent inequalities: A comparative study of educational attainment in thirteen countries*. Boulder Colorado: Westview Press.

De Graaf, P.M. & Ultee, W.C. (1998). Education and early occupation in the Netherlands around 1990: Categorical and continuous scales and the details of a relationship. In: Y. Shavit & W. Müller (Eds.), *From school to work: A comparative study of educational qualifications and occupational destinations*. Oxford: Clarendon Press.

Dekkers, H. (1990). *Seksespecifiek studiekeuzen in het wetenschappelijk onderwijs* [Sex-specific study choices at the university]. Nijmegen: ITS.

DiMaggio, P. (1982). Cultural capital and social success: The impact of status culture participation on the grades of high school students. *American Sociological Review, 47*, 189-201.

Gambetta, D. (1987). *Were they pushed or did they jump?* Cambridge: Cambridge University Press.

Huijgen, T. & Wolbers, M. (1999). *Methodiek Schoolverlatersinformatiesysteem 1998* [Methodology school-leavers information system 1998]. Maastricht: Research Centre for Education and the Labour Market.

Jonsson, J.O. (1999). Explaining sex differences in educational choice: An empirical assessment of a rational choice model. *European Sociological Review, 15*, 391-404.

Korteweg, J. A., Van Leeuwen, M., De Jong, U. & Van der Veen, I. (2003). Sociaal milieu en de keuze tussen HBO en WO [Social background and the choice between HBO and WO]. *Tijdschrift voor Hoger Onderwijs, 21*, 2-16.

Müller, W. & Wolbers, M.H.J. (2003). Educational attainment in the European Union: Recent trends in qualification patterns. In: W. Müller & M. Gangl (Eds.), *Transitions from education to work in Europe. The integration of youth into EU labour markets*. Oxford: Oxford University Press.

Need, A. & de Jong, U. (2000). Educational differentials in the Netherlands: Testing rational choice theory. *Rationality and Society, 13*, 71-98.

Polachek, S. W. (1981). Occupational self-selection: A human capital approach to sex differences in occupational structure. *Review of Economics and Statistics, 63*, 60-69.

ROA (1998). *Registratie van Uitstroom en Bestemming van Schoolverlaters (RUBS) 1998* (databestand) [Registration of Outflow and Destination of School-leavers (RUBS) 1998 (dataset)]. Available from Steinmetzarchief, Amsterdam, study P1543. Maastricht: Research Centre for Education and the Labour Market.

ROA (2002). *Schoolverlaters tussen onderwijs en arbeidsmarkt 2001* [School-leavers between education and thelabour market 2001]. Maastricht: Research Centre for Education and the Labour Market.

Van der Velden, R.K.W. & Wolbers, M.H.J. (1999). Vakkenpakketkeuze en de aansluiting tussen het voortgezet en hoger onderwijs [Study profiles and the transtion between secondary and tertiary education]. *Tijdschrift voor Onderwijsresearch, 23*, 299-315.

Van de Werfhorst, H.G., De Graaf, N.D. & Kraaykamp, G. (2001). Intergenerational resemblance in field of study in the Netherlands. *European Sociological Review, 17*, 275-293.

Webbink, H.D. (1997). Op welk niveau verder studeren na VWO of HAVO: veranderingen tussen 1982 en 1991 [The level of subsequent education after VWO or HAVO; Changes between 1982 and 1991. *Tijdschrift voor Onderwijsresearch, 22*, 228-237.

Wolbers, M.H.J. & de Graaf, P.M. (1996). Onderwijsexpansie of meritocratisering? Een verklaring voor de afgenomen samenhang tussen het ouderlijk sociaal milieu en het hoogst bereikte opleidingsniveau van kinderen' [Educational expansion or meritocratisation? An explanation for the decreased association between parental background and children's educational attainment]. *Tijdschrift voor Onderwijsresearch, 21*, 117-132.

Wolbers, M.H.J., De Graaf, P.M. & Ultee, W.C. (2001). Trends in the occupational returns to educational credentials in the Dutch labour market: Changes in structures and in the association? *Acta Sociologica, 44*, 5-20.